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The attached documents are exact copies of the European patent application described on the following page, as originally filed.

Les documents fixés à cette attestation sont conformes à la version initialement déposée de la demande de brevet européen spécifiée à la page suivante.

Patentanmeldung Nr. Patent application No. Demande de brevet n°

99118373.2

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**Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation**

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Portable electronic device updated via broadcast channel

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Portable Electronic Device Updated via Broadcast Channel**Background of the Invention**

5 This invention relates to a method and device for updating a system, and in particular, to a portable device that receives content via a broadcast channel.

The prior art includes two different categories of systems. These include systems such as electronic books which receive substantially static content (e.g., books, music, movies, newspapers and magazines) from a specialized server via a serial link, line-of-sight link, or telephone line and systems (such as car radios) which receive small size information (e.g. travel information) via a broadcast channel. Such systems are described in U.S. Patent 10 Nos. 5,761,485 to Munyan and No. 5,339,091 to Yamazaki *et al*, the contents of which are incorporated herein by reference. The size of these messages, however, is limited due to bandwidth constraints.

15 In Europe, the normal radio signal provides additional digital traffic messages (TMC), which are received and stored in a car radio for later retrieval. The PhilipsTM car radio « CARIN 520 »TM, for example, has a voice synthesizer that reads relevant traffic information to the driver of a car. Such a TMC-enabled radio comprises a decoder which decodes the received TMC messages.

20 Current electronic books (« e-books ») such as the « ROCKET EBOOK », the « SOFTBOOK ELECTRONIC TABLET », or the « EVERYBOOK ELECTRONIC BOOK » constrain the user by requiring the use of either a modem and a phone line to connect directly or over the Internet to a special server or the use of a serial connection (cable-based or infrared) to a host PC running a special « librarian » program for downloading media to the 25 e-book.

Therefore, what is needed is a system and method that updates a device with static media and which does not rely on direct or line-of-sight connection for updating purposes, but which can be updated by other means not requiring a constrained locational relationship between the receiving unit and the transmitting unit.

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Summary of the Invention

It is therefore an object of the invention to provide a system and a method of updating the contents of a portable electronic device which processes and displays large static media (e.g., electronic literature), by receiving Digital Audio Broadcast (« DAB ») signals of updating information. Use of a broadcast medium to transmit the updating information thus permits the distribution of electronic content to a large audience simultaneously.

In a feature of the invention, a smart card is used for metered access to content distributed via a broadcast medium.

10

Brief Description of the Drawing

The above brief description, as well as further objects, features and advantages of the present invention will be more fully appreciated by reference to the following detailed description of the presently preferred but nonetheless illustrative embodiments in accordance with the present invention when taken in conjunction with the accompanying drawings.

FIG. 1 is a schematic view partially in block diagram form of the invention.

20

FIG. 2 is a flow chart illustrating the method of the invention.

Detailed Description of the Invention

25

There exist many examples of media of a non-interactive and generally static nature (e.g., electronic editions of newspapers, magazines, books, music and movies), in that they include pages which do not change due to a consumer input. Books, music and movies are examples of long-term static media, whereas newspapers and magazines are examples of short-term static media.

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With non-interactive, static media that is of an appeal to a wide audience, the broadcast over a broadcast channel of this media, and the subsequent reception and decoding by a user, provides the user with generally appealing content while eliminating the need that the user establish constrained one-to-one connections. The more users there are which have the hardware to receive such broadcasts, the more efficient such a means of distributing digital content becomes.

Now referring to FIG. 1, the invention is a system 10 by which a user may receive generally static and non-interactive media using an electronic device such as an electronic book (« e-book ») 12. Such media includes digitized audio data, program-associated data such as program titles, program notes, CD cover images, and pure data broadcast using a Digital Audio Broadcast Transmitter (« DAT ») 14. The e-book 12 includes a CPU 16, a storage medium 18, a display 20, a user interface 22 (such as buttons or a touch screen for inputting navigation commands), a storage/retrieval device such as a floppy disc drive 24 by which programs and supplemental literature may be loaded to and unloaded from the device, and a Digital Audio Broadcast Receiver 26 (« DAR ») which receives and decodes the digital signal.

The DAT 14 broadcasts content to device 12. The digital audio broadcast provides dynamically changing channel configurations : after identification of the nature of the media being transmitted, the likely available excess bandwidth is calculated and the channel dynamically adapted to such media. For example, when music is being transmitted, the full bandwidth of the channel is required. However, if merely the news is being broadcast, the allocated bandwidth can be substantially reduced, thus providing sufficient bandwidth for transient subchannels, which utilize the residual bandwidth.

The DAR 26 is a radio receiver which extracts and delivers a digital data stream from a broadcast channel. Optionally, the radio connection is used as the only communication channel for the e-book 12.

In an alternate embodiment, the broadcast includes content identifiers associated with the type-media broadcast. The e-book 12 includes a screening device 40 which, using appropriate software 42, blocks and permits the downloading of certain broadcasts according to a profile derived from a user questionnaire or by direct and selective control of the user.

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Information is « pushed » to the user. The user uses his user profile or specific reception or program requests to limit the media which can be « pushed » to his display.

Alternatively, the screening device 40 scans the broadcast channel periodically for specific content and, depending on the priority of the information indicated by the user, 5 presents the information to the user via the display 20.

In a particular embodiment utilizing the screening device 40 of the invention, the e-book 12 is a portable data base of medical records used by physicians and nurses in a hospital or clinic environment. The broadcast medium updates medical records of a patient, while the physician is going about his normal business of visiting other patients. The updated 10 records may then be selectively displayed to physicians.

In another embodiment of the invention, the e-book 12 includes a smart card reader 46 and processing software, in order to provide metered access to the broadcast media. Although some media may be transmitted free of charge to users (e.g., newspapers financed 15 by advertising), other media may now be provided only on a subscription basis. Because the broadcast model is inherently a one-to-many relationship in which there is no feedback channel, the publisher of a magazine, for example, cannot directly control access to the distributed media and neither can be charged for it directly. Therefore, having a means of obtaining payment by conventional channels is essential, such as by post or by modem connection to the accounting service of the entity providing the broadcast. A smart card 50, 20 having a cryptographic decryption key 52 encoded thereon, provides this means when, for example, one of the following representative payment methods is used.

In a first representative payment method, the broadcaster of, for example, a newspaper, may charge a set fee for unlimited access of the information, for an unlimited period. This would involve the broadcaster providing the user with a decryption key 52, for 25 example, encoded on the smart card 50, or permitting the use of an existing key. The decryption key 52 is used to decrypt the encrypted content broadcast to the user. Although such a system is simple, hackers would likely take advantage of the simplicity and break the code after a short period of time. Therefore, the Broadcaster should be expected to change the encryption key periodically so as to minimize the likelihood of decoding through hacking. A subscriber simply purchases a smart card 50 encoded with the key 52 for the 30 current period. The broadcast is broadcast with the matching key, thus enabling those having

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the proper key 52 to decode the broadcast, without limitations. Once this period ends, the broadcaster changes the encryption code, thus preventing further access using the decryption key 52 encoded on the expired smart card 50 and necessitating the purchase by the user of a new card having the new matching key encoded thereon. However, this method has
5 limitations, in that the cost of the service cannot be associated with the frequency of usage during the period of validity of the smart card 50.

In another representative payment method, the publisher likewise encrypts part or all of the media to be distributed with a cryptographic key. To subscribe to broadcast media, the user obtains a smart card 50 from the publisher (or uses a previously obtained smart card) 10 which contains a cryptographic key 52 suitable for decrypting the broadcast media.

Optionally, each cryptographic decryption key 52 on the smart card 50 is associated with a count registered in a counter 54. The e-book 12 then uses the smart card 50 to decrypt the encrypted broadcast content. In case a counter 54 is associated with the cryptographic 15 decryption key 52 on the smart card 50, the smart card itself will decrement that counter each time a new issue (e.g. marked through appropriate header information) is decrypted.

Optionally, the counter 54 is decremented for each decryption process. Once the counter 54 is null, the subscription becomes invalid and must be renewed by acquiring a counter-recharge or a new cryptographic decryption key 52. A smart card 50 with a null 20 counter is no longer able to decrypt the broadcast content. Payment to the broadcaster could then be paid out of a pool, paid into an association including all or most broadcasters as members. A rating system could then determine the distribution of funds from this pool to each broadcaster. However, other means of payment are possible.

25 Optionally, debiting with the smart card 50 can be based upon a fee for each page downloaded (in which the counter 54 is decremented for each page downloaded). Further, a credit card may also be used and charged according to connect time in a manner known in the art, provided that an optional backchannel to charge the credit card is available.

Referring now to FIG. 2, using the system 10 of the invention, the method 60 of the 30 invention includes the following steps. In a first step 62, the system 10 broadcasts the DAB including static media over a certain broadcast area. In a second optional step 64, using a scanning device (which is optionally always powered on so as to maximize the reception of the DAR), the system 10 scans the DAB for desired content which matches a user profile, a

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specific user request or subscription. In a third step 66, after any scanning device detects desired broadcast media and using the DAR 26 and profile-matching software 68, the system 10 receives the desired static media so broadcast. In an optional fourth step 70, where the DAB is encrypted, the system 10 uses cryptographic technology to limit access and obtain payment for the broadcast. Step 70 is made up of substeps 72, 74, 76 and 80. In the first substep 72, the device 12 decrypts at least a portion of the DAB using a decryption key 52 encoded on a smart card 50. In the second substep 74, concurrently with the reception, the device 12 registers the DAB received. In the third substep 76, the device 12 associates a debit, indicated for example by a decrementing counter on the smart card 50, with the registered DAB. In the fourth substep 80, the associated debit is used to decide whether to disable further decryption.

An advantage of the invention is that, instead of the constraints of a direct, cable- or line-of-sight-based connection, radio broadcast and reception is used, which is, by comparison, unconstrained, unobtrusive, easy to use, and thus more convenient.

Another advantage is that now, using the invention, a range of media such as newspapers, magazines, leaflets, traffic reports, weather reports, and books (e.g., bestsellers), may now be broadcast digitally, and thus are available to the user anywhere within the range of the digital broadcast.

Another advantage is that a smart card 50 is used to provide metered access to the content of a digital broadcaster, thus permitting the broadcaster to widely broadcast media while enabling the collection of funds from subscribers in order to recover the costs of the broadcast.

Another advantage is that no explicit update function is triggered by the user ; this takes place in the background whenever data becomes available.

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Industrial Applicability

The invention is industrially applicable as it is used in a telecommunications system which provides digital content to a user wherever he might be, provided he is in range of the
5 DAT 14.

A latitude of modification, change, and substitution is intended in the foregoing disclosure and in some instances, some features of the invention will be employed without a corresponding use of the other features. For example, the system of the invention may use
10 PCs, PDAs, laptops, and other electronic devices besides e-books. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the invention.

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Claims

1. A electronic device for receiving generally static media, the device (12) having a CPU (16), a storage medium (18), a display (20), and a user interface (22), characterized in that the device includes a digital audio broadcast receiver (26) which receives and decodes a digital signal transmitted by a digital audio transmitter (14).
2. The device of claim 1 wherein the device (12) is an electronic book.
- 10 3. The device of claim 1 wherein the device (12) is a portable data base of medical records used by medical personnel in a hospital or clinic environment ; wherein the digital broadcast transmitted by the transmitter (14) updates medical records of a patient ; and wherein the updated records may be selectively displayed to the medical personnel.
- 15 4. The device of claim 1 including a smart card reader (46) and processing software, which permits a means of payment to the broadcaster.
5. The device of claim 1 wherein the digital audio broadcast receiver (26) is a radio receiver which extracts and delivers a digital data stream from a broadcast channel.
- 20 6. The device of claim 1 wherein the device (12) further includes a storage/retrieval device such as a disc drive (24).
7. The device of claim 1 wherein the device (12) includes a smart card reader (46) and processing software, which permits payment means through the use of a smart card (50), issued by the broadcaster or his agent, the card having a cryptographic decryption key (52) stored thereon, in order to provide metered access to the broadcast media.

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8. The device of claim 7 wherein each cryptographic decryption key (52) on the smart card (50) is associated with a count and, on a metered basis, a counter (54) decrements the count each time a new issue, which is marked through appropriate header information, is decrypted.

5

9. The device of claim 7 wherein the payment means uses a smart card (50) having a decryption key (52) including a counter (54), in which the counter is decremented for each page downloaded.

10

10. A system for transmitting generally static media, the system comprising an electronic device (12) having a CPU (16), a storage medium (18), a display (20), a user interface (22), and a receiver which receives a broadcast from a transmitter, the system characterized in that the transmitter is a digital audio transmitter (14) having a specialized broadcast server, the transmitter broadcasting a digital audio broadcast and in that the receiver (26) is a digital audio receiver (26) which receives and decodes the digital audio signal transmitted by the digital audio transmitter (14).

15

11. The system of claim 10 wherein the digital audio transmitter (14) broadcasts dynamically changing channel configurations in which channel bandwidth is dynamically adapted to the media being transmitted.

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12. The system of claim 10 wherein the device (12) includes a smart card reader (46) and processing software, which permits payment means through the use of a smart card (50), issued by the broadcaster or his agent, the card having a cryptographic encryption key (52) stored thereon, in order to provide metered access to the broadcast media.

25

13. The system of claim 11 wherein the dynamically changing channel configuration changes depending on the nature of the matter transmitted such that matter which is not likely to require all available bandwidth is identified, excess available bandwidth calculated and the excess allocated in a manner which provides sufficient bandwidth for transient subchannels.

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14. The system according to claim 10 wherein the digital audio broadcast includes content identifiers associated with the type of media broadcast; wherein the device (12) includes a screening device (34) which, using appropriate software (42), blocks and permits the downloading of certain broadcasts according to a profile derived from a user questionnaire or by direct and selective control of the user.
- 5
15. The system of claim 10, wherein the device (12) optionally periodically scans a broadcast channel which carries the digital audio broadcast for specific content and, depending on the priority of the information indicated by the user, presents the information to the user via the display (20).
- 10
16. The system of claim 10 wherein the device (12) includes a smart card reader (46) and processing software, which permits means of payment.
- 15
17. The system of claim 16 wherein the means of payment to the broadcaster includes the broadcaster broadcasting an encrypted signal and charging a set fee for a smart card (50) having a decryption key (52) encoded thereon and capable of decrypting the signal only during a certain period of time.
- 20
18. The system of claim 17 wherein, when inserted in a smart card reader (46) of the device (12), the smart card (50) enables unlimited access to the broadcast signal only during the certain period of time.
- 25
19. The system of claim 18 wherein the broadcast is broadcast with the matching key, thus enabling only those having the proper decryption key (52) to decode the broadcast, without limitations, until the certain period of time ends, upon which the broadcaster changes the encryption code, thus preventing further access using the decryption key (52) encoded on the expired smart card (50) and necessitating the purchase by the user of a new card having the new matching key encoded thereon.
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20. A method of broadcasting substantially static media for updating the contents of a portable electronic device (12), the method including the steps of using a transmitter (14), broadcasting a signal over a broadcast range, and using a receiver, receiving the signal by the device (12); the method characterized by the following steps :

- 5 (a) wherein the receiver is a digital audio receiver (26) and the transmitter is a digital audio transmitter (14), using the receiver (26) to receive the digital audio signals of updating information; and, optionally,
- (b) using a smart card (50) to meter access to the static media.

10 21. The above method of claim 20 wherein the static media comprises media of a non-interactive nature such as electronic editions of newspapers, magazines, books, movies, digitized audio data, program-associated data such as program titles, program notes, CD cover images, and pure data.

15 22. A method (60) for broadcasting generally static media, the method including the steps of :

- 20 (a) using a digital audio transmitter (14), broadcasting the digital audio broadcast over a certain broadcast area;
- (b) optionally using a scanning device (40), scanning the broadcast for desired media which matches a user profile, a specific user request or subscription ;
- (c) where step (b) above is performed, once the scanning device detects desired broadcast media and using the digital audio receiver (26), receiving the desired static media so broadcast ;
- (d) optionally, where the broadcast is encrypted,
- 25 (1) decrypting at least a portion of the broadcast using a decryption key (52) encoded on a smart card (50);
- (2) concurrently with the reception, registering the broadcast received; and
- (3) associating the debit with the broadcast received for billing purposes.

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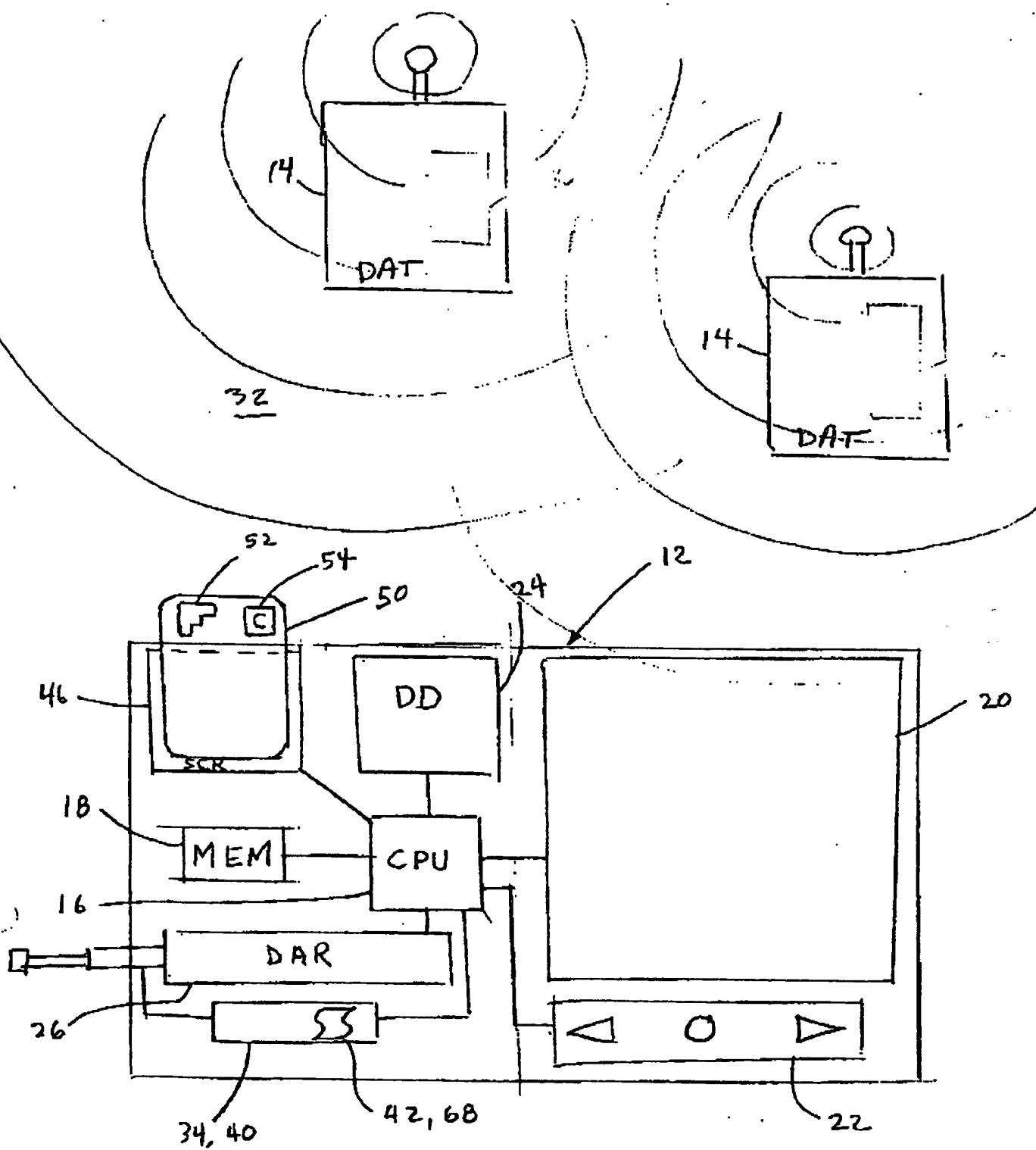
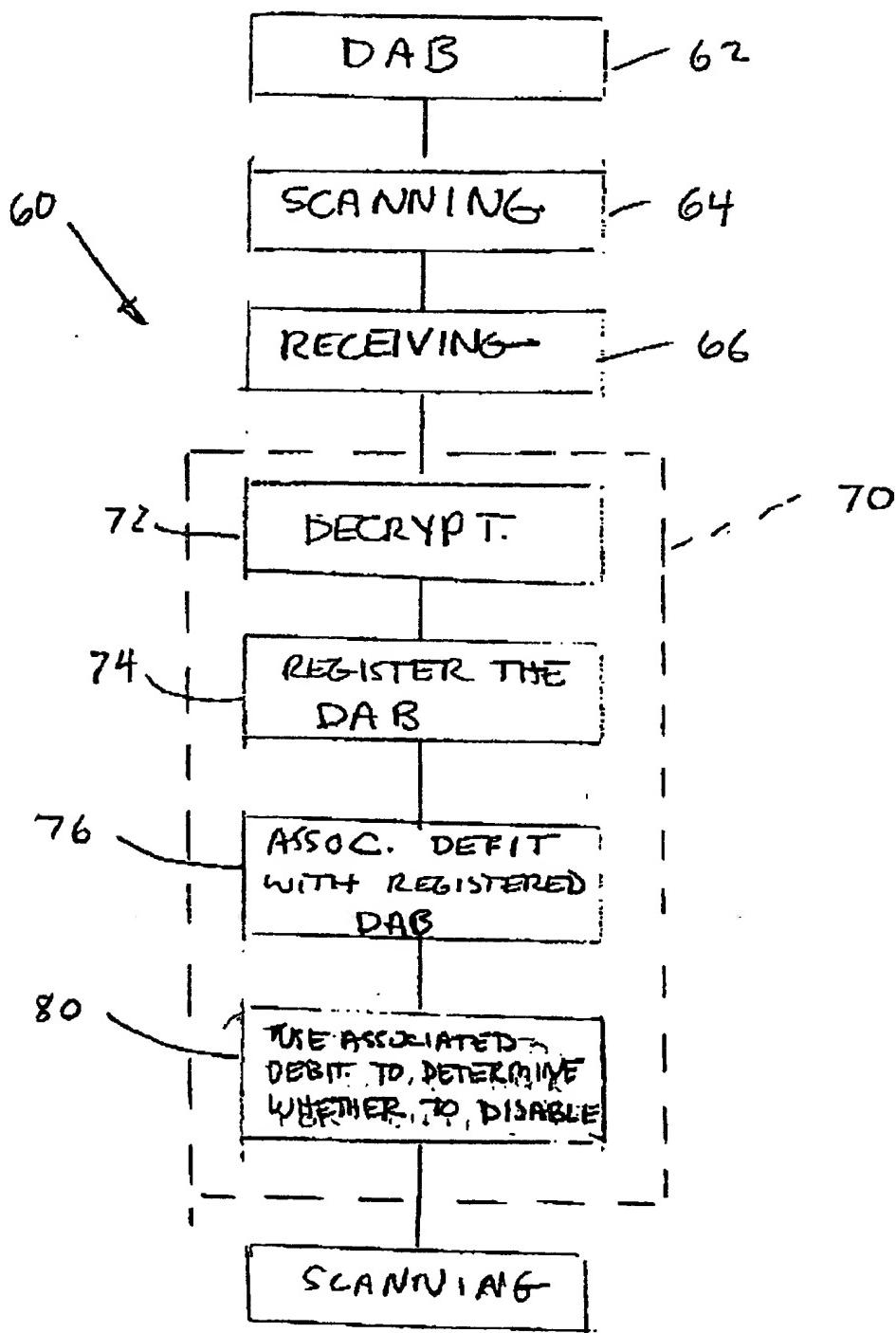


FIG. 1

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FIG. 2

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Abstract of the Invention

A system is provided for transmitting generally static media. The system (10) comprising an electronic device (12) and a digital audio transmitter (14). The electronic device (12) has a CPU (16), a storage medium (18), a display (20), a user interface (22), and a digital audio broadcast receiver (26). The digital audio transmitter (14) has a specialized broadcast server (30). The digital audio broadcast receiver (26) receives and decodes the digital audio signal transmitted by the digital audio transmitter (14).

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